What is claimed is:

1. A discharge lamp energizing power supply device comprising:

a full-wave rectifier circuit for rectifying an AC voltage obtained from a commercial AC power supply system into a full-wave rectified waveform;

a booster circuit for boosting the voltage of the full-wave rectified waveform;

a boosted-voltage changing circuit for changing the boosted voltage output from said booster circuit;

a voltage lowering circuit for lowering an output voltage from said boosted-voltage changing circuit and outputting an activating output voltage for activating a discharge lamp to turn on the discharge lamp and an energizing output voltage for keeping the discharge lamp energized; and

a control device for controlling a boosted voltage in said boosted-voltage changing circuit within a predetermined range based on the voltage of said full-wave rectified waveform when said voltage lowering circuit outputs the energizing output voltage.

2. A discharge lamp energizing power supply device according to claim 1, further comprising:

an energizing voltage detecting circuit for detecting the output voltage of said voltage lowering circuit;

wherein said control device sets the boosted voltage in said boosted-voltage changing circuit to a maximum value of said predetermined range if the output voltage of said voltage lowering circuit is detected as having reached the energizing output voltage by said energizing voltage detecting circuit while the boosted voltage in said boosted-voltage changing circuit is being

set to a minimum value of said predetermined range.

3. A discharge lamp energizing power supply device according to claim 1, wherein said control device controls the boosted voltage in said boosted-voltage changing circuit in a predetermined range at the voltage value of said activating output voltage when said voltage lowering circuit outputs the activating output voltage.

4. A discharge lamp energizing power supply device according to claim 1, wherein said full-wave rectifier circuit outputs a rectified voltage value E_o as a maximum value of the full-wave rectified waveform produced from the AC voltage obtained from the commercial AC power supply system;

said booster circuit and said boosted-voltage changing circuit jointly providing a power-factor improver for receiving the rectified voltage value E_o of the full-wave rectified waveform, boosting the voltage value of the rectified voltage value E_o to improve the power factor thereof, and outputting the boosted voltage value as an activating output voltage V_o;

said voltage lowering circuit providing an energizing device for lowering the output voltage of said power-factor improver and outputting the activating output voltage V_o for activating the discharge lamp to turn on the discharge lamp and the energizing output voltage V_L for keeping the discharge lamp energized;

wherein said discharge lamp energizing power supply device further comprising detecting circuits for detecting, respectively, said rectified voltage E_o as an input voltage, said activating output voltage V_o, and said energizing output voltage V_L; and

wherein said control device changes said activating output volt-

age V_O output from said power-factor improver in response to the detected voltages from said detecting circuits, changes said activating output voltage V_O output from said boosted-voltage changing circuit within a range from a minimum value V_{Omin} to a maximum value V_{Omax} based on said rectified voltage E_O after said discharge lamp has started to operate stably, and controls said boosted-voltage changing circuit to set said activating output voltage V_O to said maximum value V_{Omax} of said range when the output voltage of said energizing device reaches said energizing output voltage V_L while said activating output voltage V_O is being set to said minimum value V_{Omin} of said range.

5. A discharge lamp energizing power supply device according to claim 4, wherein said range for said activating output voltage V_O extends from said minimum value V_{Omin} to said maximum value V_{Omax} based on said rectified voltage E_O, and is divided into first, second, and third intervals which are successively arranged as said rectified voltage E_O increases, and said control device controls said boosted-voltage changing circuit to keep said activating output voltage V_O constant at said minimum value V_{Omin} regardless of an increase in said rectified voltage E_O in said first interval, to allow said activating output voltage V_O to increase in proportion to said rectified voltage E_O in said second interval, and to keep said activating output voltage V_O constant at said maximum value V_{Omax} regardless of an increase in said rectified voltage E_O in said third interval.

6. A discharge lamp energizing power supply device according to claim 4, wherein said control device has a delay circuit, and said control device controls said boosted-voltage changing circuit to increase said activating output voltage V_O up to said maximum value V_{Omax} and activates said delay circuit when

an energizing signal S is received from outside of the discharge lamp energizing power supply device, and to reduce said activating output voltage V_O to a voltage value in said range which is set based on said rectified voltage E_O when said delay circuit confirms elapse of a predetermined period of time.

7. A discharge lamp energizing power supply device according to claim 6, wherein said range for said activating output voltage V_O extends from said minimum value V_{Omin} to said maximum value V_{Omax} based on said rectified voltage E_O, and is divided into first, second, and third intervals which are successively arranged as said rectified voltage E_O increases, and said control device controls said boosted-voltage changing circuit to keep said activating output voltage V_O constant at said minimum value V_{Omin} regardless of an increase in said rectified voltage E_O in said first interval, to allow said activating output voltage V_O to increase in proportion to said rectified voltage E_O in said second interval, and to keep said activating output voltage V_O constant at said maximum value V_{Omax} regardless of an increase in said rectified voltage E_O in said third interval.

8. A discharge lamp energizing power supply device according to claim 7, wherein said booster circuit comprises a booster chopper having a sufficient voltage boosting ratio to achieve a high power factor under such condition as to make a maximum value of said rectified voltage E_O in said first interval smaller than the minimum value V_{Omin} of said activating output voltage V_O, and said voltage lowering circuit comprises a voltage lowering chopper having a voltage lowering ratio required to operate the voltage lowering chopper under such conditions as to make said energizing output voltage V_L smaller than the minimum value V_{Omin} of said activating output voltage V_O.